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WHAT IS CLAIMED IS:

1. A diffractive optical element having plural diffraction grating surfaces accumulated, characterized in that: a pair of diffraction grating surfaces are positioned so that a protrusion and/or a recess formed on an outside of one diffraction grating surface engages with a recess and/or a protrusion formed on an outside of the other diffraction grating surface; and that the pair of diffraction grating surfaces are defined on materials having different refractive indices and different dispersions and being formed into a kinoform, or a shape and a height of blazed or binary, close to it, such that a largest optical path difference to be applied to light rays passing through the diffraction grating surfaces with respect to plural wavelengths becomes equal to a multiple, by an integral number, of the wavelength.

2. A diffractive optical element having plural diffraction grating surfaces accumulated, characterized in that: a pair of diffraction grating surfaces are positioned so that a protrusion and/or a recess formed outside an optically effective region of one diffraction grating surface engages with a recess and/or a protrusion formed outside an optically effective region of the other diffraction grating surface; and that the pair of diffraction grating

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5 surfaces are defined on materials having different refractive indices and different dispersions and being formed into a kinoform, or a shape and a height close to it, such that a largest optical path difference to be applied to light rays passing through the diffraction grating surfaces with respect to each of plural wavelengths becomes equal to a multiple, by an integral number, of the wavelength.

10 3. A diffractive optical element having plural diffraction grating surfaces accumulated, characterized in that: a pair of diffraction grating surfaces are positioned so that a protrusion and/or a recess formed on an outside of one diffraction grating surface engages with a recess and/or a protrusion  
15 formed on an outside of the other diffraction grating surface; and that the pair of diffraction grating surfaces are defined on materials having different refractive indices and different dispersions and being  
20 formed into a kinoform, or a shape and a height close to it, such that a diffraction efficiency of diffraction light of a particular order, such as one of positive and negative first order, with respect to plural wavelengths, becomes equal to or nearly equal  
25 to 100%.

4. A diffractive optical element having plural

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5 diffraction grating surfaces accumulated,  
characterized in that: a pair of diffraction grating  
surfaces are positioned so that a protrusion and/or a  
recess formed outside an optically effective region of  
10 one diffraction grating surface engages with a recess  
and/or a protrusion formed outside an optically  
effective region of the other diffraction grating  
surface; and that the pair of diffraction grating  
surfaces are defined on materials having different  
refractive indices and different dispersions and being  
15 formed into a kinoform, or a shape and a height close  
to it, such that a diffraction efficiency of  
diffraction light of a particular order, such as one  
of positive and negative first order, with respect to  
plural wavelengths, becomes equal to or nearly equal  
to 100%.

5. A diffractive optical element according to  
any one of Claims 1 - 4, wherein the pair of  
20 diffraction gratings are disposed opposed to each  
other with a space such as by an air interposed  
therebetween.

25 6. A diffractive optical element according to  
any one of Claims 1 - <sup>4</sup>7, wherein the protrusion and  
the recess have a sectional shape of one of a triangle  
shape, a trapezoidal shape and a semi-circular shape.

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7. A diffractive optical element having plural diffraction grating surfaces accumulated, characterized in that: a pair of diffraction grating surfaces are mutually positioned so that a protrusion and/or a recess having a sectional shape of one of a triangular shape, a trapezoidal shape, and a semi-circular shape, formed on one diffraction grating surface, engages with a recess and/or a protrusion having a sectional shape of one of a triangular shape, a trapezoidal shape, and a semi-circular shape, formed on the other diffraction grating surface.

8. A diffractive optical element having plural diffraction grating surfaces accumulated, characterized in that: a pair of diffraction grating surfaces are mutually positioned so that a protrusion and/or a recess having a sectional shape of one of a triangular shape, a trapezoidal shape, and a semi-circular shape, formed outside an optically effective region of one diffraction grating surface engages with a recess and/or a protrusion having a sectional shape of one of a triangular shape, a trapezoidal shape, and a semi-circular shape, formed outside an optically effective region of the other diffraction grating surface.

9. A method of manufacturing a diffractive optical element as recited in any one of Claims <sup>1-4 7 and 8</sup> ~~1-8~~ characterized by a process for fitting the protrusion as formed on the one diffraction grating into the recess as formed on the other diffraction grating.

10. A method of manufacturing a diffractive optical element as recited in any one of Claims <sup>1-4 7 and 8</sup> ~~1-8~~ characterized by a process in which, after one diffraction grating surface is formed, another diffraction grating surface is formed by use of a mold, wherein a protrusion and/or a recess formed on the one diffraction grating surface is fitted into a recess and/or a protrusion formed on the mold for the other diffraction grating surface, whereby these diffraction grating surfaces are mutually positioned and molding of the other diffraction grating surface is performed.

11. A method of manufacturing a diffractive optical element, comprising the steps of:

forming, upon a substrate, a first diffraction grating and a recess and/or a protrusion;

preparing a mold having a protrusion and/or a recess to be engaged with the recess and/or the protrusion formed on the substrate, as well as a second diffraction grating pattern; and

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positioning the diffraction grating on the substrate and the diffraction grating pattern with each other by engaging the recess and/or the protrusion of the substrate with the protrusion and/or the recess of the mold.

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12. An optical system having a diffractive optical element as manufactured in accordance with a method as recited in Claim 11.

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13. An optical system having a diffractive optical element according to any one of Claims 1-4, 7 and 8.

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14. An optical system having a diffractive optical element as manufactured in accordance with a method as recited in Claims 9 or 10.

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